What is claimed is:

1. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a groove for wiring in a first insulating film formed on a semiconductor substrate;

(b) successively forming a barrier layer and a conductive film over said first insulating film including the inside of said groove for wiring and removing said barrier layer and said conductive film from outside of said groove for wiring, thereby forming a wiring;

(c) forming a cap conductive film on said wiring by selective growth or preferential growth of said cap conductive film on said wiring; and

(d) forming a second insulating film over said cap conductive film and said first insulating film.

2. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a groove for wiring in a first insulating film formed on a semiconductor substrate;

(b) successively forming a barrier layer and a first conductive film inside said groove for wiring to form a wiring;

(c) forming a cap conductive film on said wiring by selective growth or preferential growth of said cap conductive film on said wiring;

(d) forming a second insulating film over said cap

conductive film and said first insulating film;

(e) partly removing said second insulating film on said wiring to form an opening so that said cap conductive is exposed; and

(f) forming a second conductive film in said opening.

3. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a first wiring on a semiconductor substrate;

(b) forming a first insulating film on said first wiring;

(c) removing said first insulating film at a portion thereof corresponding to a contact region of said first wiring to form a contact hole;

(d) forming a first conductive film over said insulating film including the inside of said contact hole;

(e) removing said conductive film from outside of said contact to form a plug;

(f) forming a second insulating film over said first insulating film and said plug;

(g) removing said second insulating film at a portion corresponding to a region where a second wiring is to be formed, thereby forming a groove for wiring;

(h) successively forming a barrier layer and a second conductive film on said second insulating film including the inside of the said groove for wiring;

(i) removing said barrier layer and said second conductive

film from outside of said groove for wiring to form a second wiring;

(j) forming a cap conductive film on said second wiring by selective growth or preferential growth of said cap conductive film on said second wiring; and

(k) forming a third insulating film over said cap conductive film and said second insulating film.

4. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a first wiring on a semiconductor substrate;

(b) successively forming a first insulating film and a second insulating film on said first wiring;

(c) removing said first insulating film and said second insulating film at a portion thereof corresponding to a contact region of said first wiring to form a contact hole;

(d) removing said second insulating film at a portion thereof corresponding to a region where a second wiring is to be formed thereby forming a groove for wiring;

(e) successively forming a barrier layer and a conductive film on said second insulating film including said contact hole and the inside of the said groove for wiring;

(f) removing said barrier layer and said conductive film from outside of said contact hole and said groove for wiring to form a second wiring and a connection between said first wiring and said second wiring;

(g) forming a cap conductive film on said second wiring by selective growth or preferential growth of said cap conductive film on said second wiring; and

(h) forming a third insulating film over said cap conductive film and said second insulating film.

5. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a first wiring on a semiconductor substrate;

(b) successively forming a first insulating film and a second insulating film on said first wiring;

(c) removing said second insulating film at a portion thereof corresponding to a region where a second wiring is to be formed to form a groove for wiring;

(d) removing said first insulating film at a portion thereof corresponding to a contact region of said first wiring thereby forming a contact hole;

(e) successively forming a barrier layer and a conductive film on said second insulating film including said contact hole and the inside of the said groove for wiring;

(f) removing said barrier layer and said conductive film from outside of said contact hole and said groove for wiring to form a second wiring and a connection between said first wiring and said second wiring;

(g) forming a cap conductive film on said second wiring by selective growth or preferential growth of said cap conductive

film on said second wiring; and

(h) forming a third insulating film over said cap conductive film and said second insulating film.

6. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, further comprising the steps of:

partly removing said second insulating film defined in Claim 1, said third insulating film defined in Claim 4 or said third insulating film defined in Claim 5 to form an opening so that said cap conductive film is exposed;

burying a conductive material in said opening to form a plug; and

forming an upper wiring, which extends on said plug, on said second insulating film defined in Claim 1, said third insulating film defined in Claim 4 or said third insulating film defined in Claim 5.

7. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said wiring defined in Claim 1 or said second wiring defined in any one of Claims 2 to 5 is made of copper, silver, aluminium or an alloy containing these metals as a main component.

8. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said cap conductive film is a film made of W.

9. A method for manufacturing a semiconductor integrated

circuit device according to Claim 1, wherein said cap conductive film is a film made of WN, TiN, Ta, TaN or Ni.

10. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said cap conductive film is formed at a pressure of 1 Torr (1 x 1.33322 x 10^2 Pa) or below.

11. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said second insulating film is formed by the steps of:

(a) forming a TEOS film or a carbon-containing silicon-based insulating film on said cap conductive film; and

(b) forming, on said TEOS film or said carbon-containing silicon-based insulating film, a film whose dielectric constant is lower than that of said TEOS film or said carbon-containing silicon-based insulating film.

12. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said second insulating film is formed by the steps of:

(a) forming, on said cap conductive film, a diffusion-preventing insulating film for preventing the diffusion of a conductor material constituting said cap conductive film; and

(b) forming, said diffusion-preventing insulating film, a low dielectric insulating film whose dielectric constant is lower than said diffusion-preventing insulating film.

13. A method for manufacturing a semiconductor integrated circuit device according to Claim 12, wherein said diffusion-preventing insulating film is made of a silicon nitride film, a PSG film, a silicon carbide film or a carbon-containing silicon-based insulating film.

14. A method for manufacturing a semiconductor integrated circuit device according to Claim 12, wherein said low dielectric insulating film includes at least one of a TEOS film, a fluorine-containing silicon oxide film such as SiOF film, a carbon-containing silicon-based insulating film such as SiOC, an organic insulating film and a porous silica film.

15. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said cap conductive film is formed after cleaning substrate surfaces with a solution containing hydrogen fluoride (HF) or a solution capable of removing foreign matters or a contaminant metal.

16. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said cap conductive film is formed after treatment of substrate surfaces with hydrogen.

17. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein the step of forming said cap conductive film includes the step of cleaning substrate surfaces with a solution containing hydrogen fluoride (HF), hydrogen peroxide (H_2O_2), or a solution capable of removing

foreign matters or a contaminant metal after the selective growth or preferential growth.

18. A semiconductor integrated circuit device, comprising a first insulating film formed on a semiconductor substrate, a groove for wiring formed in said insulating film, a barrier layer formed at side walls and a bottom of said groove for wiring, a conductive film formed inside said groove for wiring and formed on said barrier layer, a cap conductive film formed on said conductive film, and a second insulating film formed on said cap conductive film and said first insulating film.

19. A semiconductor integrated circuit device, comprising a wiring formed on a semiconductor substrate, a first insulating film formed on said wiring, a contact hole formed on a contact region of said first wiring and formed in said insulating film, a plug form inside the contact hole, a second insulating film formed on said first insulating film and said plug, a groove for wiring formed in said second insulating film, a barrier layer formed on side walls and a bottom of said groove for wiring, a conductive film formed inside said groove for wiring and formed on said barrier layer, a cap conductive film formed on said conductive film, and a third insulating film formed on said cap conductive film and said second insulating film.

20. A semiconductor integrated circuit device, comprising a wiring formed on a semiconductor substrate, a first insulating film formed on said wiring, a groove for wiring formed in said

first insulating film and a first contact hole extending from a bottom of said groove for wiring to said wiring, a barrier layer formed in said groove for wiring and side walls and a bottom of said first contact hole, a first conductive film formed inside said groove for wiring and said first contact hole and also on said barrier layer, a cap conductive film formed on said first conductive film, a second insulating film formed on said cap conductive film and said first insulating film, and a second conductive film formed inside a second contact hole formed in said second insulating film.

21. A semiconductor integrated circuit device according to Claim 20, wherein said first insulating film includes an insulating film wherein said groove for wiring is formed, and an insulating film where said first contact hole is formed.

22. A semiconductor integrated circuit device according to Claim 18, further comprising an opening formed in said third insulating film wherein a conductive material is buried in said opening formed over said cap conductive film.

23. A semiconductor integrated circuit device according to Claim 18, wherein said first conductive film is made of copper, silver, aluminium, or an alloy mainly comprised of these metals.

24. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film is a film made of W.

25. A semiconductor integrated circuit device according

to Claim 18, wherein said cap conductive film is a film made of WN, TiN, Ta, TaN or Ni.

26. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film is a film formed by selective growth or preferential growth.

27. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film is a film formed at a pressure of 1 Torr (1 x 1.33322 x 10^2 Pa) or below.

28. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film has a uniform thickness.

29. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film has such a uniformity that a variation in film thickness is within 50% or below.

30. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film has a uniform thickness irrespective of a wiring width.

31. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film is thinner than the barrier layer at a bottom of said groove for wiring.

32. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film has a thickness of 2 to 20 nm.

33. A semiconductor integrated circuit device according

to Claim 18, wherein the second insulating set forth in Claim 18 or 20, or the third insulating film set forth in Claim 19 has a TEOS film or silicon carbide film formed on said cap conductive film, and a film which is formed on said TEOS film or silicon carbide film and which has a dielectric constant lower than said TEOS film or silicon carbide film.

34. A semiconductor integrated circuit device according to Claim 18, wherein said second insulating film has a diffusion-preventing insulating film for preventing diffusion of a conductor material constituting said conductive film formed on said cap conductive film, and a low dielectric insulating film which is formed on said diffusion-preventing insulating film and has a dielectric constant lower than said diffusion-preventing insulating film.

35. A semiconductor integrated circuit device according to Claim 34, wherein said low dielectric insulating film is made of a TEOS film an SiOF film, a porous silica film or an organic insulating film.

36. A semiconductor integrated circuit device according to Claim 34, wherein said diffusion-preventing insulating film is made of a silicon nitride film, a PSG film, a silicon carbide film or a carbon-containing silicon-based insulating film.

37. A method for manufacturing a semiconductor integrated circuit device according to Claim 1, wherein said cap conductive film is selectively formed on said wiring by a

selective CVD (chemical vapor deposition) method, and said conductive film is constituted of a copper film.

38. A semiconductor integrated circuit device according to Claim 18, wherein said cap conductive film is selectively formed on said wiring by a selective CVD (chemical vapor deposition) method, and said conductive film is constituted of a copper film.

39. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a groove in a first insulating film formed on a semiconductor substrate;

(b) depositing a copper film on said first insulating film including the groove;

(c) removing said copper film from outside of said groove to bury said copper film in said groove; and

(d) forming a cap conductive film on said copper film in said groove by selective growth of the cap conductive film on said copper film buried in said groove by a selective CVD (chemical vapor deposition) method.

40. A method for manufacturing a semiconductor integrated circuit device according to Claim 39, further comprising, after the step of (d), cleaning with a solution capable of removing a foreign matter or a contaminant metal.

41. A method for manufacturing a semiconductor integrated circuit device according to Claim 40, further comprising, between

the steps of (c) and (d), cleaning with a solution capable of removing a foreign matter or a contaminant metal.

42. A method for manufacturing a semiconductor integrated circuit device according to Claim 39, wherein said cap film is made of a tungsten film.

43. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a groove in a first insulating film formed on a semiconductor substrate;

(b) depositing a copper film on said first insulating film including the groove;

(c) removing said copper film from outside of said groove to bury said copper film in said groove;

(d) forming a cap conductive film on said copper film in said groove by selective growth of the cap conductive film on said copper film buried in said groove; and

(e) cleaning the resultant semiconductor substrate with a solution capable of removing a foreign matter or a contaminant metal.

44. A method for manufacturing a semiconductor integrated circuit device according to Claim 43, further comprising, after the step of (d), treating said copper film with hydrogen.

45. A method for manufacturing a semiconductor integrated circuit device according to Claim 44, further comprising, between the steps of (b) and (c), treating said copper film with hydrogen.

46. A method for manufacturing a semiconductor integrated circuit device according to Claim 43, further comprising, between the steps of (c) and (d), cleaning with a solution capable of removing a foreign matter or a contaminant metal.

47. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a groove in a first insulating film formed on a semiconductor substrate;

(b) depositing a copper film on said first insulating film including the groove;

(c) treating said copper film with hydrogen;

(d) after the step (c), removing said copper film from outside of said groove to bury said copper film in said groove;

(e) treating the copper film, buried in said groove, with hydrogen.

48. A method for manufacturing a semiconductor integrated circuit device according to Claim 47, further comprising, after the step of (d), cleaning with a solution capable of removing a foreign matter or a contaminant metal.

49. A method for manufacturing a semiconductor integrated circuit device, comprising the steps of:

(a) forming a groove in a first insulating film formed on a semiconductor substrate;

(b) depositing a copper film on said first insulating film including the groove;

(c) removing said copper film from outside of said groove to bury said copper film in said groove;

(d) after the step of (c), cleaning with a solution capable of removing a foreign matter or a contaminant metal; and

(e) after the step of (c), treating said copper film with hydrogen.

50. A method for manufacturing a semiconductor integrated circuit device according to Claim 49, wherein the step of (e) is carried out after the step of (d).